

# PREVENTION OF THE SPREAD OF YELLOW FEVER.

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## PREVENTION OF THE SPREAD OF YELLOW FEVER.<sup>1</sup>

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MR. PRESIDENT, AND GENTLEMEN :—One of the prime factors in the prevention of the spread of yellow fever is an early knowledge of its existence. A study of the history of nearly all epidemics, will show that the disease has gained considerable head-way before its existence has been admitted or publicly announced. The reasons for this are obvious : oftentimes there is a genuine doubt in the mind of the practitioner, and the ability to accurately and positively diagnose yellow fever is not possessed by every physician. When in serious doubt, the fear of raising alarm, with all the consequent damage to the commerce of the city or town, induces the practitioner to hold his peace ; or he may absolutely conceal the cases, when known, in the hopes that they may prove sporadic.

For example, during the examinations which were made of the mortuary records of Brunswick, Georgia, in connection with the yellow-fever epidemic there in 1893, it was demonstrated by a process of reasoning to be explained further on, that yellow fever had prevailed in Brunswick in 1890, and had been kept concealed. Not only did the mortuary records show this, though the cases were not diagnosed as yellow fever, but evidence of creditable citizens has been obtained to this effect ; and reliable testimony, that one of the physicians of Brunswick had made the statement in the fall of 1890, that yellow-fever was prevalent—almost epidemic—and “ if the Lord did not send a frost soon, it would be impossible for them longer to conceal it.” It is known now that yellow fever had existed last year a month prior to the death of Assistant-Surgeon Branham and prior to its being declared epidemic.

It is evidently, therefore, of the highest importance, that, when suspicious cases are announced, they should be passed upon by some well known expert, whose decision will be accepted as final ; and who is free from all local influence. Acting upon this theory, the Marine Hospital Service does not hesitate to send immediately an expert to any locality suspected of being infected with yellow fever. One who can proclaim the disease if it exists, without bringing upon himself the anathemas of friends, associates, and city authorities, and the ruin of his professional prospects.

A new method of determining the presence of yellow fever, in some cases with positive accuracy, has been announced by Dr. John Guiteras, professor of pathology in the University of Pennsylvania, and at present sanitary inspector of the Marine Hospital Service. I can best explain his theory by reading his letter to me upon the subject :

<sup>1</sup>Presented at the Montreal meeting of the Association.



PHILADELPHIA, PA., SEPTEMBER 18, 1894.

*Dr. Walter Wyman,*  
*Surgeon-General,*  
*U. S. Marine Hospital Service :*

SIR :—According to promise I give you in brief, the practical application of the studies I have made of the death rate, in relation to yellow fever.

I have frequently found peculiar features of the mortality immediately preceding the acknowledgment of the presence of an epidemic of yellow fever. When these features are sufficiently pronounced, they enable a careful student,

1. To announce, without fear of contradiction, the existence of a commencing epidemic of yellow fever, when, perhaps, it is denied on the ground of carelessly observed clinical data ;

2. To point out the existence and the date of beginning and ending, of outbreaks in past years, which outbreaks had not been generally, if at all, recognized ;

3. The student is further enabled to allay excitement, and silence false and damaging rumors as to the existence of yellow fever in a locality. He may even foretell, with some degree of certainty, that an epidemic of yellow-fever is not likely to arise within the city and season, subject to his observation.

These accomplishments, theoretically, all amount to the same thing, namely : the finding of yellow fever through other than bedside observations ; but I thus separate them, because, practically, they deal with queries that present themselves to the so-called yellow-fever expert, as distinct problems of great importance.

The peculiar features of the mortality, upon which the solution of the above problem is based, are an unusual preponderance of deaths, in the white population in general, and especially of white children, and natives of the northern section of the country and Europe. The causes of death that are found to account for this increase of the white mortality are : acute cerebral and gastroenteric affections, of children, and above all, acute manifestations of malaria.

This means, in my opinion, that errors of diagnosis are made in the early stages of the epidemic, and that, frequently, the case which is supposed to be the starting point of an outbreak, is not the first case of yellow-fever occurring in that particular epidemic. Isolated cases have developed in the earlier portion of the summer, and, I believe, not rarely, are the result of importation that has taken place towards the end of the preceding season, or during the winter or spring.

The errors of diagnosis between the yellow and the malarial fevers, will be the subject of a special report. Much of what was written along our Atlantic border concerning the malarial fevers, in the earlier days of the American School of Medicine, shows the frequency of these errors. The bilious remittent fever was frequently yellow fever. The former disease gradually disappeared, with the retreat of yellow fever towards its tropical home.

Yours very truly,

(Signed) JOHN GUITERAS.

Acting upon the theory advanced in this letter and with a strong determination to promptly prevent the spread of yellow fever during the present season, as early as July of the present year, Dr. Guiteras was ordered to visit the various coast cities of the south from Baltimore to Mobile, and to examine the mortuary records thereof and to promptly report to the Marine Hospital Bureau any suspicion of yellow fever in any of the cities resulting from said investigation. He has just concluded his examination of the mortuary records of the cities of Baltimore, Norfolk, Wilmington, Charleston, Savannah, Jacksonville, Key West, Tampa, and Mobile. In none of these records has he found any suspicion of the existence of yellow fever at this season.



A blank form has been provided to be filled out at stated intervals by the Marine Hospital officers stationed in these various cities, which will in future give the bureau the desired information and call attention to any possible danger as shown by said records.

Experience proves that when the existence of yellow fever is suspected reliance can not be placed upon the reports of physicians, and a house to house inspection, therefore, should be made, under municipal or state authority.

A knowledge of the existence of the disease having been obtained, the first efforts should be made to confine it to its present locality. Much has been written of the futility of attempting to stamp out yellow-fever. In view of the fact, however, that most epidemics have become well established before being announced and before any steps have been taken to suppress them, the futility of these efforts should not deter us from attempting to check the disease after the presence of a limited number of cases. If, for example, a few cases have been found, and examination of the records shows that in all probability the disease had not previously existed before these cases were discovered, there would be reasonable ground for hope of preventing its further spread by active local quarantine measures. These may be stated briefly as follows, viz.: An early house to house inspection; the depopulation of the house or infected area, care being taken to disinfect the clothing of exposed persons, the non-immunes leaving the infected area to be kept under observation, and if possible in a place set aside for this special purpose; house or district quarantine; a thorough disinfection by sulphur fumes and bi-chloride of mercury of the infected places and their contents. At this time the facts as they exist should be made public, with a view of allowing those who wish to leave the city to do so. Depopulation of the city at the very first appearance of yellow fever, which in all probability will become epidemic, is greatly to be desired, but under restrictions hereinafter mentioned.

As soon as the disease has become epidemic, consideration for the surrounding country takes precedence over the comfort and commercial interests of those within the infected area; a strong cordon by land and by sea is to be drawn, military in character, and egress from the city thereafter allowed only through a detention camp where those leaving the city must be forced to undergo a period of probation of ten days to demonstrate their freedom from the disease.

Following are the regulations which were promulgated by the secretary of the treasury, August 12, under the act of February 15, 1893, to prevent the spread of yellow fever:



UNITED STATES QUARANTINE RULES TO BE OBSERVED IN PLACES INFECTED  
WITH YELLOW FEVER.

TREASURY DEPARTMENT,  
OFFICE OF THE SECRETARY,  
Washington, D. C., August 12, 1893.

*To medical officers of the Marine-Hospital Service, quarantine officers in the United States, and others concerned:*

Pursuant to the act of February 15, 1893, entitled "An Act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," the following regulations have been made thereunder and are hereby promulgated according to the terms of the act:

1. All persons affected with yellow fever, or who are believed to have been exposed to the infection, will be isolated under observation until free from infection and all their effects properly disinfected. Communication with infected places will not be allowed except for the necessary conveyance of supplies, etc., which must be under the supervision of a duly qualified medical sanitary inspector.

2. The localities contiguous to those infected, and infected localities, so far as it may be safely done, should be depopulated as rapidly and as completely as possible; persons from non-infected localities, and who have not been exposed, leaving without detention; those who have been exposed, or who come from infected localities, being required to undergo a period of detention of ten days from date of last exposure in camps of probation. The clothing or anything capable of conveying infection shall not be allowed to leave the infected locality without disinfection.

3. Camps of probation shall be inspected twice daily or oftener, and the suspects should be conveniently segregated in groups. A hospital sufficiently isolated shall be provided for each probation camp.

4. When practicable, camps of detention should be provided for those who require it.

5. Buildings in which cases of yellow fever have occurred, and localities believed to be infected, must be disinfected as thoroughly as possible.

6. As soon as the disease shall have been declared epidemic, the railway trains carrying persons who may be allowed to depart from a city or place infected with yellow fever shall be under medical supervision. A medical sanitary inspector should accompany each train when practicable, and enforce prompt isolation of any person who may be attacked with the disease, and report the same immediately to the proper health authorities. When, in the opinion of the proper health authorities, it is necessary, the railroad companies should be required to attach an extra car for hospital purposes to each train carrying persons from an infected place, which may be side-tracked at some safe and convenient locality on the road.

CHARLES S. HAMLIN,  
*Acting Secretary.*

It will be opportune here to read from the more recent regulations which have been prepared in the Marine Hospital Bureau and promulgated by the secretary of the treasury to prevent the spread of certain diseases, viz.: cholera, yellow fever, small-pox, typhus fever, leprosy, and plague. The portions of these regulations applying to yellow fever are given here in detail.

## ARTICLE II.

## NOTIFICATION.

1. State and municipal health officers should immediately notify the supervising surgeon-general of the United States Marine Hospital Service by telegraph or by letter of the existence of any of the above mentioned quarantinable diseases in their respective states or localities.

## ARTICLE III.

## GENERAL REGULATIONS.

1. Persons suffering from a quarantinable disease shall be isolated until no longer capable or transmitting the disease to others. Persons exposed to the infection of a quarantinable disease shall be isolated, under observation, for such a period of time as may be necessary to demonstrate their freedom from the disease.

All articles pertaining to such persons, liable to convey infection, shall be disinfected as hereinafter provided.

2. The apartments occupied by persons suffering from quarantinable disease, and adjoining apartments when deemed infected, together with articles therein, shall be disinfected upon the termination of the disease.

3. Communications shall not be held with the above named persons and apartments, except under the direction of a duly qualified officer.

4. All cases of quarantinable disease, and all cases suspected of belonging to this class, shall be at once reported by the physician in attendance to the proper authorities.

5. No common carrier shall accept for transportation any person suffering with a quarantinable disease, nor any infected article of clothing, bedding, or personal property.

The body of any person who has died of a quarantinable disease shall not be transported save in hermetically sealed coffins, and by the order of the state or local health officer.

## ARTICLE IV.

## YELLOW FEVER.

In addition to the foregoing regulations contained in Article I, the following special provisions are made with regard to the prevention of the introduction and spread of yellow fever:

1. Localities infected with yellow fever, and localities contiguous thereto, should be depopulated as rapidly and as completely as possible, so far as the same can be safely done; persons from non-infected localities, and who have not been exposed to infection, being allowed to leave



without detention. Those who have been exposed, or who come from infected localities, shall be required to undergo a period of detention and observation of ten days from the date of last exposure in a camp of probation or other designated place.

Clothing and other articles capable of conveying infection, shall not be transported to non-infected localities without disinfection.

2. Persons who have been exposed may be permitted to proceed without detention to localities incapable of becoming infected, and whose authorities are willing to receive them, and after arrangements have been perfected to the satisfaction of the proper health officer for their detention in said localities for a period of ten days.

3. The suspects who are isolated under the provisions of Par. 1, Article III, shall be kept free from all possibility of infection.

4. So far as possible, the sick should be removed to a central location for treatment.

5. Buildings in which yellow fever has occurred, and localities believed to be infected with said disease, must be disinfected as thoroughly as possible.

6. As soon as the disease becomes epidemic, the railroad trains carrying persons allowed to depart from a city or place infected with yellow fever, shall be under medical supervision.

7. Common carriers from the infected districts, or believed to be carrying persons and effects capable of conveying infection, shall be subject to a sanitary inspection, and such persons and effects shall not be allowed to proceed, except as provided for by Par. 2.

8. At the close of an epidemic, the houses where sickness has occurred, and the contents of the same, and houses and contents that are presumably infected, shall be disinfected as hereinafter prescribed.

## ARTICLE V.

### DISINFECTION FOR YELLOW-FEVER.

1. Apartments infected by occupancy of patients sick with yellow fever, shall be disinfected by one or more of the following methods:

(a) By thorough washing with an acid solution of bichloride of mercury (bichloride of mercury 1 part, hydrochloric acid 2 parts, water 1,000 parts) or other efficient germicidal agent. If apprehension is felt as to the poisonous effects of the mercury, the surfaces may, after two hours, be washed with clear water.

(b) Thorough washing with a five per cent. solution of pure carbolic acid.

(c) By sulphur dioxide, 24 to 48 hours' exposure, the apartments to be rendered as air-tight as possible.

2. Bedding, wearing apparel, carpets, hangings, and draperies, infected with yellow fever, shall be disinfected by one of the following methods:



(a) By exposure to steam at a temperature of 100° to 102° C. for thirty minutes after such temperature is reached.

(b) By boiling for fifteen minutes, all articles to be completely submerged.

(c) By thorough saturation in a solution of bichloride of mercury, 1 to 1,000, the articles being allowed to dry before washing.

Articles injured by steam (rubber, leather, containers, etc.), to the disinfection of which steam is inapplicable, shall be disinfected by thoroughly wetting all surfaces with (a) a solution of bichloride of mercury, 1 to 800, or (b) a five per cent. solution of carbolic acid, the articles being allowed to dry in the open air prior to being washed with water, or (c) by exposure to sulphur fumigation in an apartment air-tight, or as nearly so as possible.

A new feature in the management of an epidemic of yellow-fever was demonstrated during the recent epidemic in Brunswick, viz., the stationing of a medical officer in command of the districts outside of the cordon lines and detention camp. The officer in command on the field of action must necessarily be at the centre to attend to the guards, to supervise the treatment of the sick, the disinfection of clothing and buildings, and other necessary measures of sanitation. His work may be well supplemented by an officer in command of measures to be taken outside, with the triple object of pursuing and returning any refugee who may have escaped the cordon lines; of investigating rumors which are always rife of the spread of the disease in other localities; and taking measures to prevent people from the infected or suspected districts travelling upon the railroads unless provided with a proper certificate, showing that there is no danger of their carrying infection with them.

I know of no easier way of fully describing the methods to be taken to prevent the spread of yellow-fever, than by giving a short narrative of the measures which were put into operation in and around Brunswick during the yellow-fever epidemic in 1893.

#### YELLOW FEVER ON SATILLA RIVER AND AT BRUNSWICK IN 1893.

June 15, 1893, the American Barkentine *Annita Berwind*, from Havana, arrived at Brunswick, Georgia, quarantine. She cleared June 19 for Conquest's wharf on the Satilla river, Georgia, fifty-six miles from Brunswick, arriving there on the 20th; on the evening of which day the master took to his bed. On June 21 he was moved to Conquest's camp, a cross-tie camp eight miles distant from the wharf, where he died, June 25, of yellow-fever. The vessel was immediately sent to the national quarantine station at Blackbeard Island, and twenty-five stevedores who had been loading her were also sent there for detention and observation. Surgeon H. R. Carter was immediately sent to Conquest's camp with authority to employ guards, nurses, and physicians, and, with the volun-



tary assistance of Dr. W. F. Brunner, took every possible precaution to prevent the spread of the disease, keeping the seventy-three persons in the camp under a close observation, burning and boiling all the possibly infected articles, and disinfecting the house wherein the patient died.

The following are extracts from his reports dated July 1 and 3 :

July 1.

There are seventy-three persons in the camp, living in small houses scattered through the brush. The nurses and others directly exposed are isolated separately and all others are under surveillance, being inspected twice a day by myself. One man who was directly exposed to contagion ran away before I reached here, but I have, I believe, located him, and have sent the constable after him.

Dr. Brunner (to whose help I owe much) and I burnt and boiled nearly all of the possibly infected articles yesterday, and will finish to-day. I have sent to Brunswick for disinfectants, and I will disinfect the house, etc., when they arrive. The house is open, unoccupied, and under guard. There is considerable difficulty in managing the personnel of the camp, or rather, it is a matter of some delicacy, as they frankly said that had they known we were coming, they would have run off, and it is only by making it to their interest to stay here that I can hold them.

I authorized the issue of a ration to the families (eight in number) of the stevedores taken to Sapelo. They were absolutely destitute, and as it was necessary to keep them under surveillance, there was no other way. They were in full communication with the stevedores during the six days of loading. I engaged Dr. McKinnon to inspect them every day. I cannot do this, as they are scattered over a radius of about eight miles, and the nearest one is ten miles off from here. Any sickness among them will be reported to me.

Dr. Atkinson will help me here after to-day; he having also been exposed it seemed well to keep him under surveillance. The probability is that I shall be here about fourteen days if there are no new cases. I confess, however, that I regard it as not at all unlikely that we may have others. Other cases will not materially complicate matters if they occur among those whom I have in close isolation.

July 3.

No new cases of fever so far. Yesterday I brought back the suspect who had left camp the day before my arrival, as the constable failed to do so. He is now in camp. The disinfectants arrived yesterday, and to-day I am treating the house with sulphur dioxide. It is too open, in spite of calking, to do a very satisfactory disinfection by this means, but I have used the gas in excess threefold. Will use the bichloride solution to-morrow. All fabrics have been burnt or boiled as their condition required.

I have been hauling light wood and piling it all over the wood-pile and trash-heaps in the yard of the house, and I will burn it off this afternoon. I would have done this before, but it was too wet. The object is to burn off all vegetable matter down to the sand, which it will do. I have already burnt large fires over the places where the excreta were thrown, keeping them up eight or nine hours. Dr. Brunner left for Savannah yesterday at 4 A. M.

Owing to the thoroughness of the above measures, there was no development of the fever in the camp or at the wharf.

This captain of the *Annita Berwind*, who died at Conquest's Camp, was said to have been feeling ill before leaving Brunswick quarantine, and was known to have visited the city. This led to an inspection of the Brunswick quarantine by Surgeon Carter, by which it was shown that there was gross violation, not only of the United States quarantine regulations, but of ordinary quarantine principles.



Acting upon the information thus received, the National Government took charge of the Brunswick quarantine under the act of February 15th, 1893, and Assistant Surgeon J. W. Branham, Marine Hospital Service, was placed in command.

Dr. Branham took charge of the quarantine July 31st, and died August 20th. Under a misapprehension of the nature of his disease, he had been removed by the health officer of Brunswick from the quarantine to the city for treatment. From the reports of the medical officers subsequently assigned to duty in Brunswick it appears that there were a number of infected localities in Brunswick at about the same time and the evidence does not warrant the assumption that Dr. Branham introduced yellow fever into the city.

In Surgeon Murray's report, it is shown that he may possibly have contracted the disease from the ballast pile at the quarantine station, but at the same time the colored laborers engaged in discharging ballast at the quarantine (21 in all) had free access to the city, and it was through them and not through Dr. Branham, that the disease was probably introduced and generally disseminated. Dr. Branham was in the city on the 10th of August; in the afternoon returned to quarantine; on his way to the station was seized with a chill which was followed the next day by a fever; was removed on the 11th to the city and on the 12th was reported as suffering from yellow-fever.

Surgeon W. H. H. Hutton was immediately ordered from Norfolk to Brunswick, arriving there on the evening of August 14; and Surgeon H. R. Carter, who was at Pensacola, was also ordered there, arriving on the morning of the 15th.

Dr. Branham did not see a single yellow-fever case, nor did he inspect a single infected vessel. It is remarkable that yellow fever prevailed extensively among the colored people and the assumption that the disease was introduced by the colored ballast laborers, who after performing their duty in discharging ballast of infected ships, immediately and freely visited the city, is the most probable explanation of the cause of the epidemic.

As will be seen by the reports, vigorous disinfection of the first infected premises, depopulation of limited areas and guarding the same, were carried on with apparently favorable results. August 17th, Sanitary Inspector John Guiteras arrived to assist in the preventative measures. On the 8th of September, there having been but three deaths, and fifteen days having expired since the last death, on recommendation of Surgeon Hutton, the report of Sanitary Inspector Guiteras that he had "finished an examination of the cases of fever existing at present and none were suspicious," and the report of Passed Assistant Surgeon G. M. Magruder stating that "there seems to be no cause existing for continuing the quarantine," orders were issued to raise the quarantine.

In the meantime, all arrangements had been made for the rapid construction of a detention camp at Waynesville, Georgia, twenty-five miles

distant, under the direction of Surgeon Hutton, which was completed, ready for occupancy, by September 2d. On September 10th, Surgeon Hutton was obliged to be relieved on account of physical debility.

On the evening of September 13th, two additional deaths from yellow fever were reported by Sanitary Inspector Guiteras, in one of which a certificate of death from consumption had been given. Instructions were immediately telegraphed to employ necessary help for quarantining and disinfecting the infected localities. Passed Assistant Surgeon Geddings arrived, under orders, September 16th. Surgeon R. D. Murray was ordered from Key West quarantine (Dry Tortugas), arriving there September 18th, and reported a strict cordon established. The postmaster general was requested to have the mails from Brunswick disinfected. Train inspectors were appointed at Jesup and Waycross. Passed Assistant Surgeon Geddings was ordered to assume command of the detention camp at Waynesville. The railway companies were instructed to sell no tickets south of Atlanta; and on the 16th directions were given to open the camp immediately and make it the only outlet from Brunswick. On the 17th the disease was declared epidemic by the Brunswick board of health. On the 18th Dr. Paul Von Seydewitz of New Orleans was ordered to Atlanta to consult the railway authorities and to prevent Brunswick refugees from going south. The camp was officially opened September 18th, under the immediate command of Passed Assistant Surgeon Geddings, Surgeon Murray being the officer in command of all measures in the infected districts. At that time there were twenty known cases in various portions of the city. In addition to the land cordon, a guard of six men with boats as a day and night patrol was established on the Cumberland river to prevent refugees going to Florida by water. Guards were also stationed with boats at convenient points on the main land and on the adjacent islands to intercept refugees going north by water, the cordon thus being made complete both on land and on water.

A number of physicians of reputation who had themselves had yellow fever and had experience in treating the disease were immediately sent to Brunswick to assist in the management of the epidemic. The details connected with the management of the epidemic will all be found in the reports of the several officers; but in general it may be stated, that Surgeon Murray with a full corps of accomplished surgeons and an experienced hospital steward was in command within the city, and that his efforts to prevent the contagion reaching other portions of the country were supplemented by the assistance of the revenue cutters at Beaufort and Savannah carrying medical officers of the Marine Hospital Service, patrolling the water-ways north of Brunswick to inspect the guards stationed therein, and in one instance capturing a boatload of refugees and carrying them to the neighboring National quarantine station at Blackbeard Island, to undergo a period of detention.

October 4th, Surgeon H. R. Carter, who had been temporarily trans-



ferred for duty in Washington, was ordered to Waycross with the triple object of inspecting rumors of yellow fever prevailing in various localities to which Brunswick refugees had resorted; to intercept any refugees who might escape through the cordon lines; and to establish a system of train inspection which would permit the railroads to continue traffic without interruption from the sanitary authorities of the various small cities alarmed at the possibility of infected persons coming within their borders.

This service on the outside of the infected area was a new feature in epidemic management, and proved very efficacious. It will be seen from Surgeon Carter's report that thirteen places were inspected by him, in which it was feared yellow fever existed, and his authoritative statement relieved the communities of the suspicion which rested upon them. Surgeon Carter was assisted by Assistant Surgeon J. S. Nydegger, and a corps of fifteen sanitary inspectors.

The epidemic was declared at an end November 25th. The detention camp was closed November 30th. The total number of yellow fever cases in Brunswick during the epidemic was 1,076, with forty-six deaths. The disease prevailed at no other locality except Jesup, which, as shown in Surgeon Murray's report, became infected before the disease was declared epidemic in Brunswick.

The following is an extract from the report of Passed Assistant Surgeon H. D. Geddings, in charge of the detention camp near Waynesville, Georgia:

The camp was officially opened for the reception of refugees from Brunswick, Georgia, on the 18th of September, 1893, and closed by the order of Surgeon R. D. Murray, M. H. S., permitting the return of all refugees to their homes in Brunswick, Georgia, November 30th, 1893. Four hundred and thirty-one persons availed themselves of the privileges of the camp, of whom about two hundred and twenty-five were white, and the remainder black and colored. The site of the camp, selected by Surgeon W. H. H. Hutton, was twenty-three miles west of Brunswick, immediately upon, and on, the south side of the Brunswick and Western Railway, and upon an eminence about twenty-five feet above the general level of the surrounding country, which is generally swampy, and within a mile of the margin of what is locally known as the Buffalo Swamp. As is usual in this section, the elevation was covered with a dense growth of yellow pine, scrub oak, and black gum trees. The soil was a gray, sandy loam, overlying a stratum of yellow clay, and the natural drainage of the site in all directions was good.

On my arrival I found that, under direction of Surgeon Hutton, an area two hundred feet square had been cleared of trees and undergrowth, and at the four angles of this square, rough, but substantial buildings had been erected, which were used respectively as kitchen, white and colored dining rooms, guard room, quarter-master's store-room, executive office and telegraph office, and commissary. A depot and baggage room were provided at the railway. Along the line connecting the buildings, at an interval of twenty feet, were placed wall tents 12x14 feet with flies, and subsequently further rows of tents were pitched behind these, and opening on streets fourteen feet wide. All tents were provided with substantial floors, raised six inches above the ground, and the following equipment was provided:

For each inmate—one spring wire bottomed cot, one cotton mattress, one hair pillow, two sheets, one pillow case; and for each tent—two tin wash-bowls, two tin cups, and two wooden chairs. Remarkable ingenuity was displayed by the inmates in construction of articles of furniture from packing cases, waste lumber, etc. The tents proved of good



quality in service, and quite comfortable in all weather. It is suggested, however, that any further tents be constructed with a wall, eighteen inches or two feet higher, and of one foot greater pitch. A hospital establishment of two buildings was provided at a distance of one half mile from the camp. The following routine was observed, the calls being given by the bugle :

5:30 a. m. Reveille and attendants' breakfast.

6:00 a. m. Breakfast.

8:00 a. m. Sick call.

12:00 m. Dinner.

4:00 p. m. Sick call.

5:00 p. m. Supper.

Sunset. Retreat and call to quarters.

9:00 p. m. Tattoo.

9:15 p. m. Taps (extinguish lights.)

The meals were substantial, abundant, and as varied as possible. In all cases, women and children were served at the first table, and the races were served in separate dining-rooms. The following rules were announced and seemed to work well in practice :

1. At reveille all inmates will rise and prepare for breakfast.
2. All quarters must be clean, floors swept, and beds made up before first sick call.
3. Meals will be served in the dining room only, and at stated hours, and no meals shall be carried from the dining room to any quarters, except upon the written order of the medical officer, renewed from day to day.
4. At sick calls, all inmates will repair to their quarters, and there be visited and inspected by the medical officer, who will prescribe and advise as he deems best.
5. All suspicious cases of disease shall be isolated at once, and until such time as their nature may be determined.
6. All cases of infectious diseases will be treated only in the hospital provided for the purpose.
7. No baggage from infected localities shall be brought into camp until disinfected by such process as may be directed, and only such wearing apparel as may be deemed absolutely necessary will be brought into camp after the disinfecting process.
8. All wearing apparel shall be a second time disinfected before discharge from camp.
9. Any person taken ill between the two sick calls, shall notify the nearest guard, who will in turn immediately notify the medical officer.
10. Guards are enjoined by their vigilance, to prevent the commission of any nuisance near any quarters ; should such nuisance be discovered, the inmates of the nearest quarters will be required to police the same under the supervision of the guard, who will report the fact.
11. Inmates will confine themselves to the inner lines of the camp after retreat (sunset) call.
12. While innocent enjoyment will be encouraged, the strictest propriety of conduct will be demanded and enforced.

The discipline of the camp was, in the main, good throughout. But two confinements for misbehavior were required during the whole duration of the camp.

All baggage was submitted to steam disinfection upon arrival at, and departure from, the camp. The apparatus used was devised by Surgeon Carter, M. H. S., and constructed in a baggage car, the steam being supplied by the locomotive.

In addition to other duties, nearly sixteen hundred cars, boxes and flats, were disinfected for the B. and W. railway, sulphur fumigation being used for boxes, and drenching with solution of bichloride mercury (1-800) for flat cars. This disinfection of cars enabled the traffic into Brunswick to be carried on with a minimum of delay and hardship.

Two cases of yellow-fever occurred among the inmates of the camp ; one resulted in recovery, one in death. Both cases occurred in the persons of sailors who had arrived at Brunswick on vessels trading there, and both would seem to show a period of incubation of at least five days, thus justifying our detention of ten days.



Following are the rules for train inspection service, enforced by Surgeon Carter :

Inspectors will allow none to board a train, unless with a certificate, between Waycross and Savannah.

If certificate can be examined before boarding, without detention of train, it must be done, and if unsatisfactory the person presenting same will not be allowed to board.

After boarding, the certificate and the person must be carefully examined, and the inspector assures himself that the passenger is not recently from Jesup or any infected locality.

If the passenger is known to be a recent resident of Jesup or any infected locality, or to have been in such place at any time during the past two (2) weeks, he will not be allowed to board, even if he has a certificate.

If, after boarding, either the certificate or the examination of passenger is not satisfactory, the passenger will be turned over to the city authorities at Waycross or Savannah, or at the place where he desires to stop, if between those places, and the facts noted and reported.

A record will be kept of the names of all passengers inspected, name of signer of certificate and his rank, date of inspection, date of certificate, and place of boarding train, and where passenger is bound and what disposition is made of him, whether passed or turned over to local authorities ; also any other facts worth notice.

Inspectors will aid local quarantine authorities in any way in their power consistent with their duties, and give them any information, and obey all local quarantine regulations.

It only remains to be noted that the cost of the measures taken by the government in and around Brunswick was about \$73,000 exclusive of the new quarantine plant.

The Marine Hospital Bureau has had constructed and now ready for use in any epidemic, two portable disinfecting machines ; one a sulphur furnace with fan blower and necessary pipes for the disinfection of a portion, or the whole interior of a house ; the other a steam chamber of sufficient length and width to receive a mattress. Each apparatus is on wheels and may be readily drawn by two horses, and both are constructed after special designs including the most recent developments in practical disinfection.

I cannot close this paper without commenting upon the sad necessity which occasionally arises in the United States of resorting to the above described methods of preventing the spread of yellow fever. Unfortunately these measures work a degree of hardship to the people within the infected territory, but on the principle of the greatest good to the greatest number their enforcement, besides being necessary, is undoubtedly just. The question remains, however, how long have the people of the United States, particularly the southern portion thereof, to be subjected to the

possibility of such rigorous measures, and how long must the scourge of yellow fever continue to threaten? Are we to accept this constant menace as a necessary feature of Southern life? Or should we not transfer our energies from the battlefields of epidemics, as it were, and throw them into a campaign against the causes which produce the epidemics.

Now these causes are all practically one, namely, faulty sanitation of cities, a want of sanitary engineering, and the greater the want of sanitation in a given city within the yellow-fever zone, the greater is it as a source of danger. Yellow fever is not indigenous in the United States, but the conditions prevailing in many of our southern seaboard towns and cities are such that when introduced it may become nourished, grow strong, and overpower the people. It is incumbent on every state board of health in the South to leave no stone unturned and to work without ceasing until its cities and towns are supplied with perfect sewerage and perfect water supply. In the past, yellow fever was a menace to the cities of the North as well as to the cities of the South. Now it gives but little concern on the Atlantic coast at ports north of Baltimore. Is there any plausible explanation of this other than that the sanitary conditions, in other words, the drainage, the sewerage, the water supply of cities of the more Northern states, have been greatly improved? As a preventive, therefore, against the spread of yellow fever, sanitation of Southern cities is of vital importance.

But while we may thus cast the mote out of our own eye, we cannot be indifferent to the beam which is in our neighbor's eye. Within sixty miles of our coast of Florida there is an island between which and the United States intimate commercial relations exist. Naturally salubrious, by reason of marked indifference to municipal sanitation, it constantly maintains yellow fever in its harbors and on its shores. You all know I refer to the Island of Cuba and particularly to the port of Havana. Let our Southern cities be ever so perfect in their sanitary arrangements, the danger constantly threatening from Havana and other Cuban ports, from Vera Cruz and other Mexican ports, from Rio de Janeiro and other Brazilian ports, would still be great enough to keep us in a state of perpetual alarm. The attention of sanitarians of the United States should be directed to this ~~place~~ <sup>phase</sup> of the yellow-fever situation and the subject should be agitated until some ameliorating response is received from these neighboring countries.